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1.   A method of reconstructing a signal from a given set of data, with a prediction function representing a predictable effect on the signal, and a noise function representing unpredictable noise, the method comprising the steps of:

altering the coordinate basis of the data and signal from an original coordinate basis in order to produce a prediction function having a reduced set of variables;

performing a Bayesian reconstruction capable of operation of positive, negative, and complex signal values to produce a reconstruction signal; and

converting the reconstruction signal back into the original coordinate basis to generate a signal.

2.   A method according to claim 1, wherein the Bayesian reconstruction is performed using a Fourier basis.

3.   A method according to claim 1, wherein the Bayesian reconstruction is performed using a wavelet basis.

A marked up version of claim 4 follows:

Claim 4   (Amended/Marked up)   A method according to [any preceding] claim 1, wherein the Bayesian reconstruction employs [the] a maximum entropy method.

5.   A method according to claim 4, employing an evaluation parameter, α, which is determined from a prior reconstruction.

30   6.   A method according to claim 4, employing an evaluation parameter, α, which is set at a fixed value.

7.   A method according to claim 4, employing an evaluation parameter, α, which is determined during the reconstruction

15   step.

A marked up version of claim 8 follows:

    Claim 8.   (Amended/Marked up)   A method according to [any of]

7], [in which] <u>wherein</u> the signal to be reconstructed is an image signal.

9.   A method according to claim 8, wherein the image

5   signal is a medical image signal.

A marked up version of claim 10 follows:

    Claim 10.   (Amended/Marked up)   A method according to [any of]

7], [in which] <u>wherein</u> the signal to be reconstructed is a radar signal.

A marked up version of claim 11 follows:

    Claim 11.   (Amended/Marked up)   A method according to [any of]

7], [in which] <u>wherein</u> the signal to be reconstructed is an acoustic data signal.

12.   A method according to claim 11, wherein the acoustic data signal is an underwater sonar signal.

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13.   A method according to claim 11, wherein the acoustic data signal is a geophysical data signal.

A marked up version of claim 14 follows:

Claim 14.   (Amended/Marked up)   A method according to [any of] clai

7], [in which] <u>wherein</u> the signal to be reconstructed is a signal from spectroscopy.

A marked up version of claim 15 follows:

Claim 15.   (Amended/Marked up)   A method according to [any of] clai

7], [in which] <u>wherein</u> the signal is a communication signal[, such as a time-series signa